



**SECOND ANNUAL**  
**DOD ACQUISITION INSIGHT DAYS**  
**20-22 APRIL 2009 • DAYTON, OHIO**



# Acquisition Physics 101

Everything I learned about acquisition I learned from Hollywood

"Each problem that I solved became a rule which served afterwards to solve other problems."

- Rene Descartes (1596-1650), "Discours de la Methode"

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Does anyone believe  
commercial industry  
has the secret  
formula to perfect  
program acquisition?

# Commercial Example from Aerospace



- As of December 2008, first flight expected 2<sup>nd</sup> Quarter 2009, 1<sup>st</sup> delivery 1<sup>st</sup> Quarter 2010
- Boeing's July 2007 prediction at the roll-out event:
  - First flight September 2007
  - First Commercial passengers May 2008

Announced delays of at least 20 months

**Technical -  
Schedule**

# Commercial Example from Computer/Software



Announced delays of at least 10 months, quickly followed by system patches

- **March, 2006: Microsoft plans to delay the consumer launch of its much-anticipated Windows Vista operating system to January 2007.**
  - It had originally aimed to launch Vista - the first major update since Windows XP was introduced five years ago - in the second half of 2006.
  - Now, a version will be available for corporate customers from November 2006.
  - Vista will then be rolled out for consumers after the holiday shopping season.

**Technical -  
Schedule**



# Commercial Example from Construction



- The Big Dig was estimated in 1985 at \$2.8 billion
  - A July 17, 2008 article in The Boston Globe stated, "In all, the project will cost an additional \$7 billion in interest, bringing the total to a staggering **\$22 billion**"
  - On January 23, 2008, it was reported that the consortium that oversaw the project, would pay \$407 million in restitution for its poor oversight of subcontractors (some of whom committed outright fraud), as well as primary responsibility in the **death of a motorist.**

**Cost - Schedule**

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So, how does  
commercial program  
management  
experiences compare  
to AF acquisition  
programs?

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# Sources of Weapon System Cost

Growth Analysis of 35 Major Defense Acquisition Programs

Category	Development Cost Growth (%)	Procurement Cost Growth (%)	Total Cost Growth (%)
Error	19.6	14.7	14.6
Cost Estimate	18.0	8.4	10.1
Schedule Estimate	1.0	.9	.9
Technical Issues	0.6	5.4	3.5
Decisions	30.7	57.4	41.6
Requirements	17.5	9.5	12.9
Affordability	-1.9	-0.5	-1.3
Quantity	4.3	40.8	21.9
Schedule	6.0	10.0	8.9
Inter- or intraprogram transfers	4.8	-2.4	-0.7

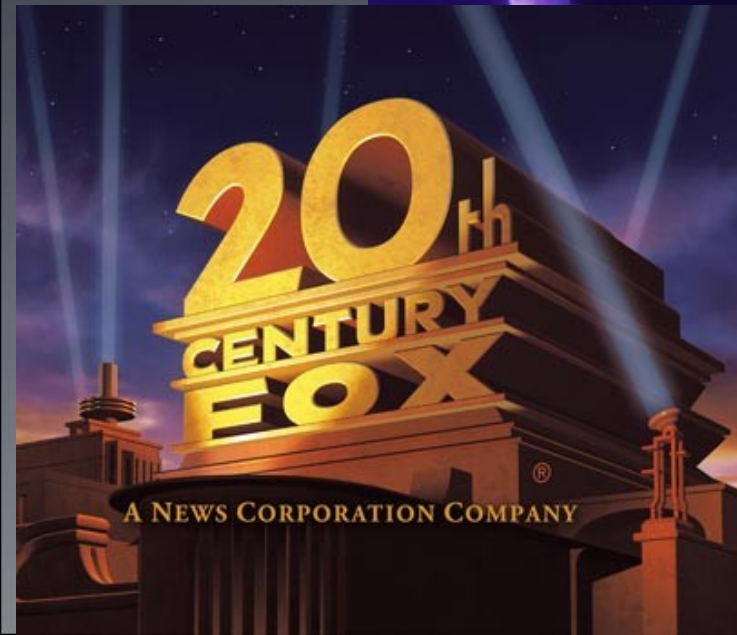


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Well then, who  
should we turn to  
for advice on how  
to improve Air  
Force acquisition?

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# Let's give Hollywood a shot at acquisition advice!



# Acquisition Advice from Hollywood

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- Program Manager's Responsibility
- Clear and Executable Requirements
- Technical Realism
- Accurate Cost
- Believable Schedule
- Effective Communication

# on Program Manager Responsibilities

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Regardless of all the “help” and guidance you might receive, in the end, it is all the Program Manager’s fault.



# Ben Hur's View of Working In A Program Office

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"We keep you alive to serve this ship  
(program). So row well and live."

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# Comments on Setting Requirements

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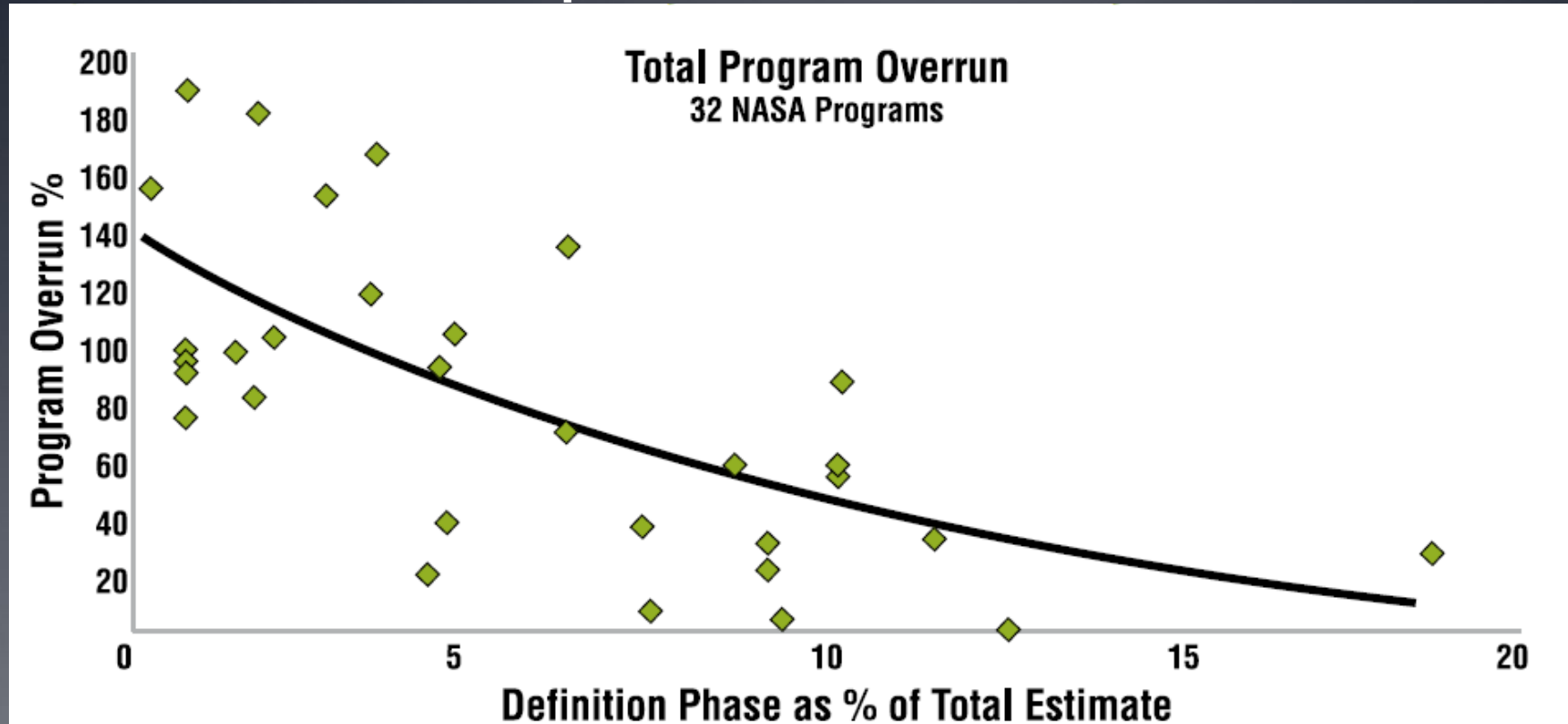
The user may be responsible for establishing requirements, but the program manager is responsible for ensuring they are executable.

they are executable.



# Initial Requirements Definition/Tradeoff

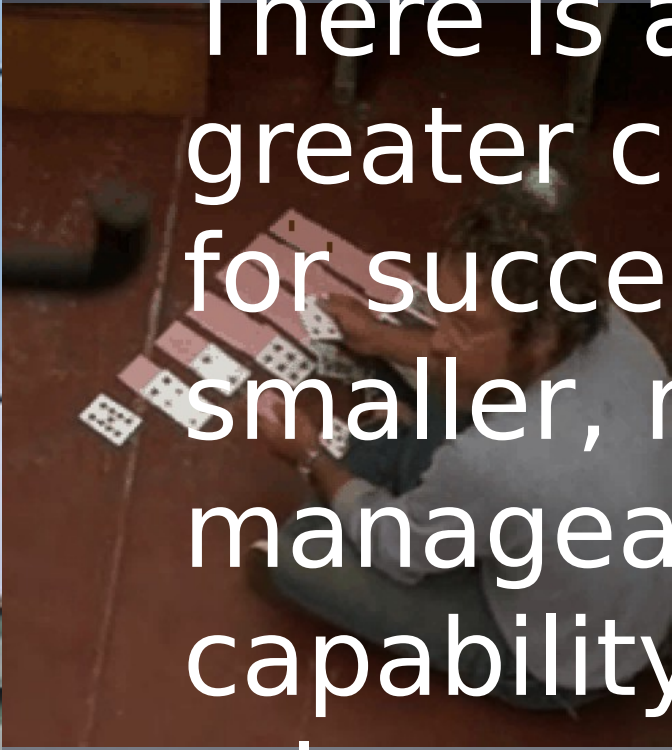
## The Value of Initial Requirements and



**“Performance improves dramatically when a significant proportion ... of the total program cost is for requirements and concept definition.”**

# Police Chief Martin Brody on Spiral Requirements

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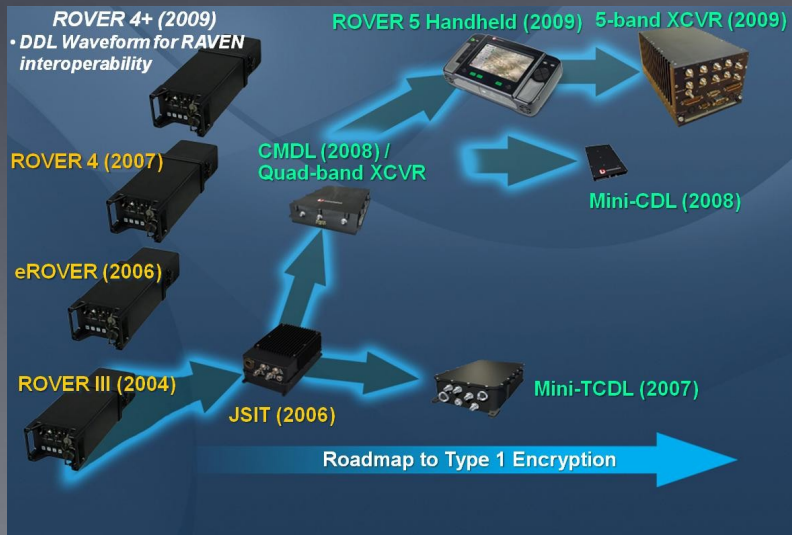
A photograph of a person sitting on a wooden floor, playing dominoes. The person is wearing a light-colored shirt and dark pants. Several dominoes are scattered on the floor around them.

There is a  
greater chance  
for success with  
smaller, more  
manageable  
capability  
releases.

# Smaller, More Manageable Capability Releases



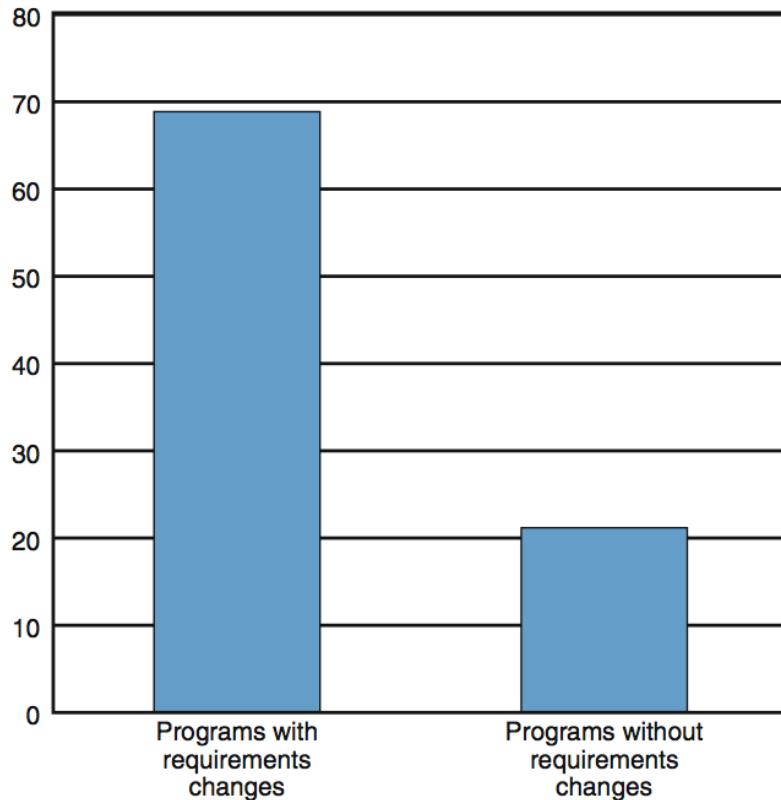
- Small Diameter Bomb
  - Phase I: Fixed Target Variant
    - MS B to IOC: ~ 3 Years
  - Phase II: Moving Target Variant
    - MSB Planned FY 10
- Remote Ops Video Enhanced Rec'r (ROVER)
  - I: Video a/a (Predator to AC-130)
  - II: Video a/g downlink (Aircraft to JTACS)
  - III: Multi-band
  - eROVER III: Enhanced reception
  - IV: Added S-band, other improvements
  - V: Handheld design with encryption capability



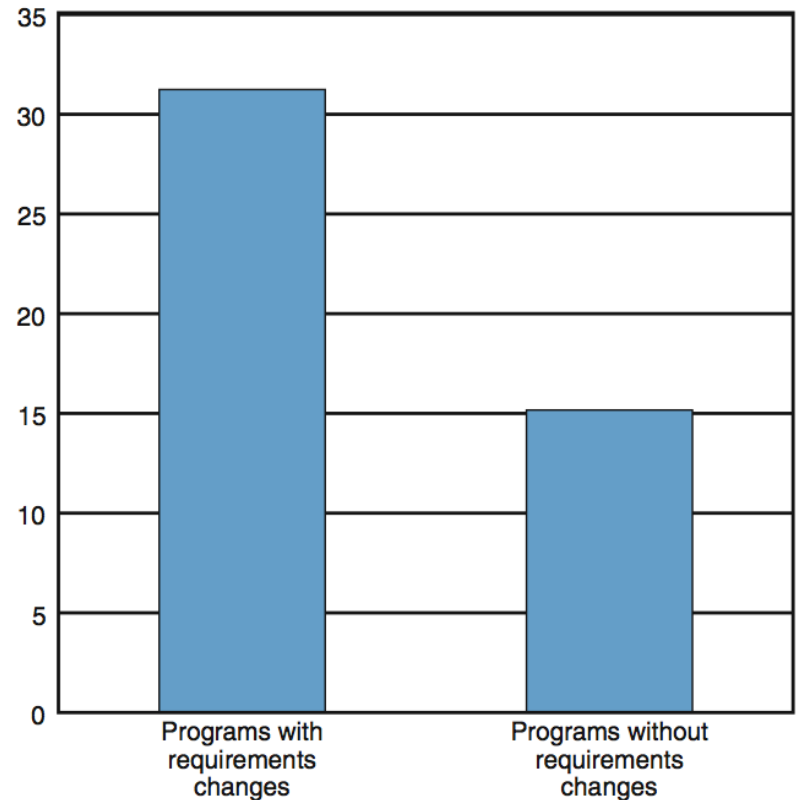
# Requirements Stability

## Requirements Changes, Research and Development Cost Growth, and Delays in Providing

Percentage of change in RDT&E cost



Months



Source: GAO analysis of DOD data.

# HAL 9000 on Technology

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While we  
would like to  
believe  
otherwise,  
technology is  
not perfect,  
expect errors  
or have a

# Technology Readiness Levels

## Cost and Schedule Experiences on Product

Product and associated technologies	TRL at program start	Product Development	
		Cost Growth	Schedule Slippage
Comanche helicopter		101 percent	120 percent
Engine	5		
Rotor	5		
Forward looking infrared	3		
Helmet mounted display	3		
Integrated avionics	3		
Brilliant Anti-Armor Submunition		88 percent	62 percent
Acoustic sensor	2		
Infrared seeker	3		
Warhead	3		
Inertial measurement unit	3		
Data processors	3		
Hughes HS-702 satellite		None	None
Solar cell array	6		
Ford Jaguar		None	None
Adaptive cruise control	8		
Voice activated controls	8		



# Technology Maturity

## Weapon Systems Acquisition Reform Act of 2009

### Section 103. Technological Maturity

**Assessments.** For years now, the Government Accountability Office (GAO) has reported that successful commercial firms use a “knowledge-based” product development process to introduce new products. Although DOD acquisition policy embraces this concept, requiring that technologies be demonstrated in a relevant environment prior to

**According to GAO, 164 of the 356 critical technologies on these programs failed to meet even the minimum requirements for technological maturity.**

level of product knowledge. According to GAO, 164 of

**The DDR&E’s determinations would serve as a basis for determining whether a program is ready to enter the acquisition process.**

problem by making it the responsibility of the Director of Defense Research and Engineering (DDR&E) to periodically review and assess the technological



# Dr Evil's View on Cost Estimating

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Don't under

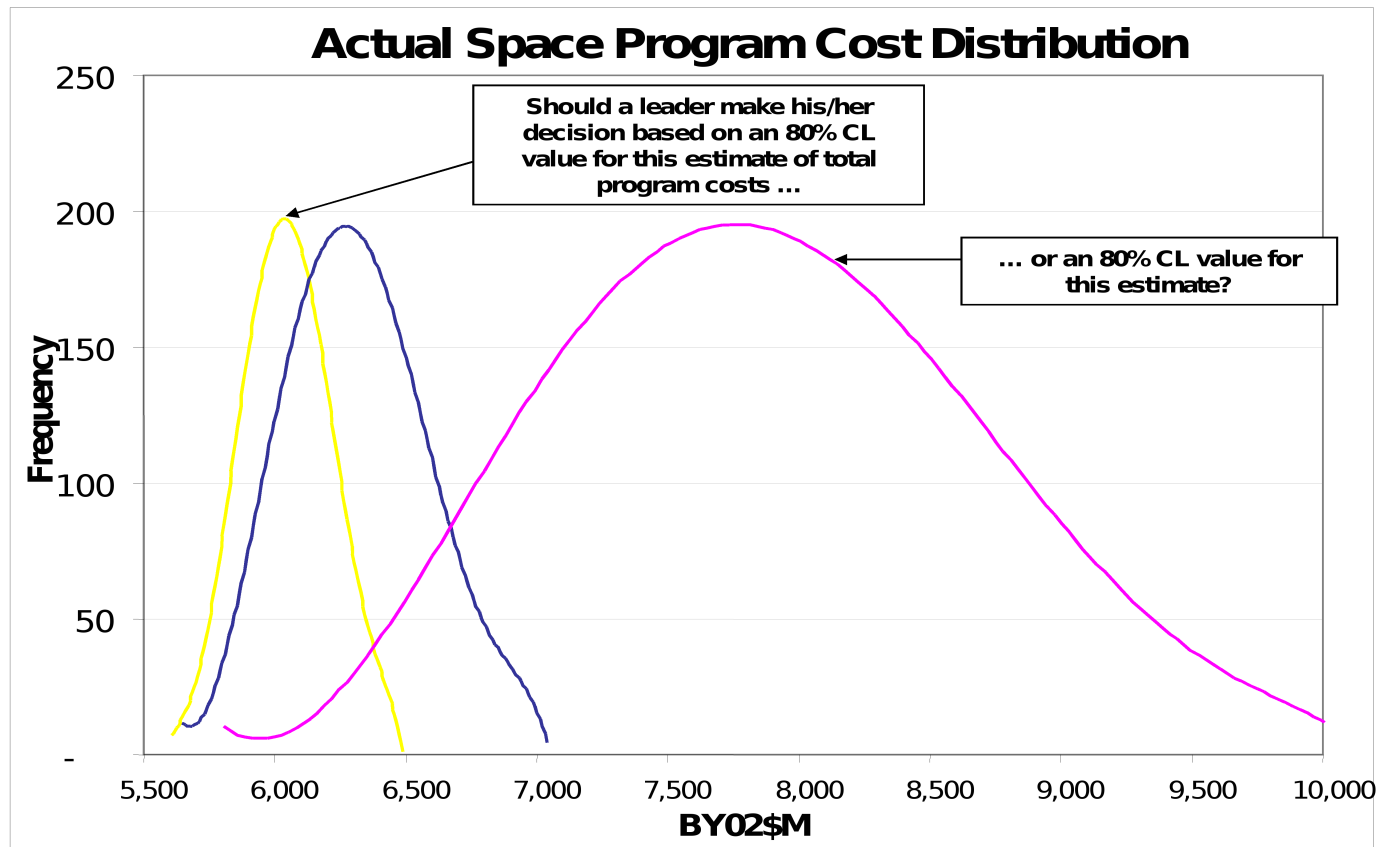
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(80%

confidence...maybe

# A Typical Air Force Program?



# Cost Estimating (Guessing)

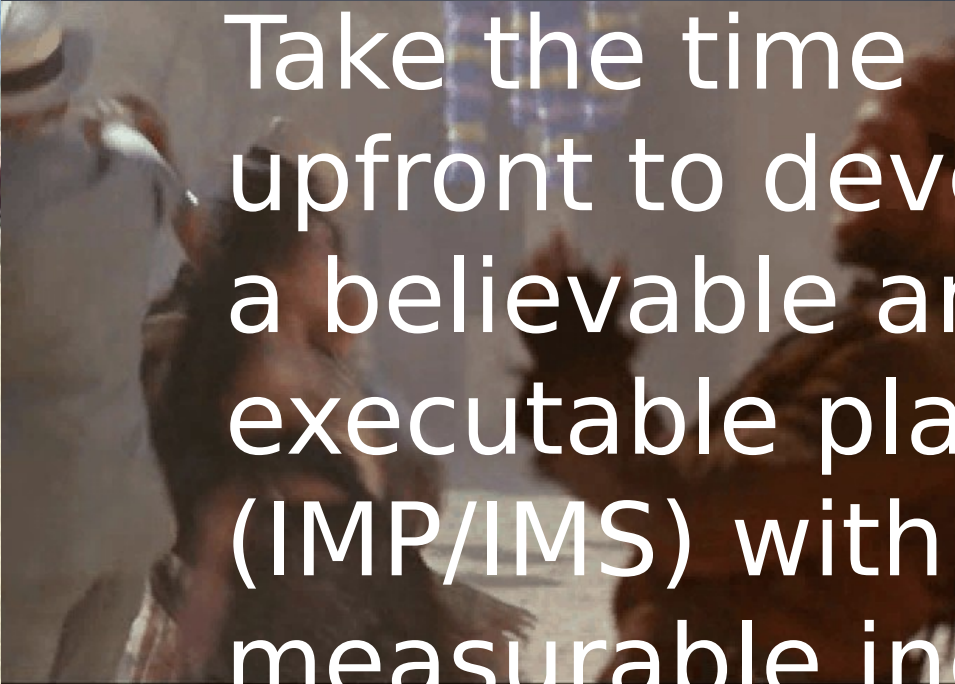
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***“It’s tough to  
make predictions,  
especially about  
the future.”***

***-Yogi Berra***

# Importance of Good Plan (Schedule)

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A blurred image of a crowd of people, possibly at a festival or event, with some individuals wearing traditional Mexican clothing.

Take the time  
upfront to develop  
a believable and  
executable plan  
(IMP/IMS) with  
measurable inch-  
stones and use it.



# What's Driving All The Delays?

## Analysis of DOD Major Defense Acquisition Program Portfolios (Fiscal Year 2009 Dollars)

Portfolio status	Fiscal year 2003 portfolio	Fiscal year 2007 portfolio	Fiscal year 2008 portfolio
Number of programs	77	95	96
Total planned commitments	\$1.2 trillion	\$1.6 trillion	\$1.6 trillion
Commitments outstanding	\$724 billion	\$875 billion	\$786 billion
Change to total research and development costs from first estimate	37 percent	40 percent	42 percent
Change in total acquisition cost from first estimate	19 percent	26 percent	25 percent
Estimated total acquisition cost growth	\$183 billion	\$301 billion <sup>a</sup>	\$296 billion
Share of programs with 25 percent or more increase in program acquisition unit cost	41 percent	44 percent	42 percent
Average delay in delivering initial capabilities	18 months	21 months	22 months

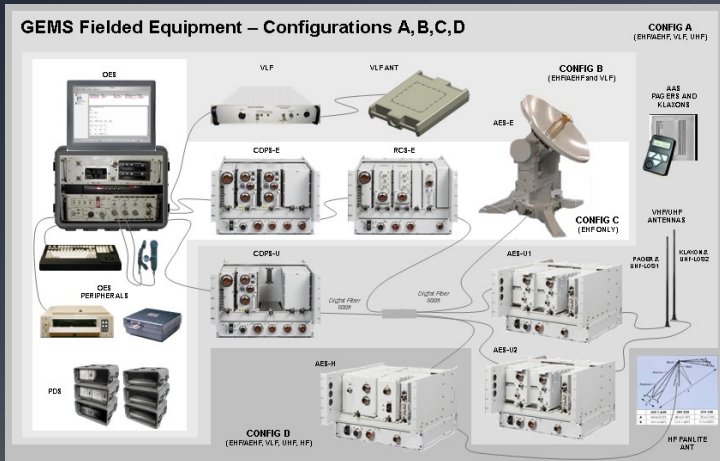
Source: GAO analysis of DOD data.

<sup>a</sup>Last year, GAO reported total acquisition cost growth for the fiscal year 2007 portfolio was \$295 billion in fiscal year 2008 dollars. This figure is now expressed in fiscal year 2009 dollars.

Note: 31 Mar AT&L Letter to DEPSECDEF Contends \$296B is a Sensationalized Figure



# System (GEMS)



- 140% (~\$138M) Overrun (EAC) And 4 Years Late
  - Heavy Dependency On JTRS Cluster 1 Products – Didn't Materialize
- Critical Path Elements, Linkages Insufficient
  - Not Linked To EVM System Or Accessible Program Metrics
  - Tasks Would Push To The Right Without Any Flags
  - Inadequate Planning And Processes Made It Difficult To Manage And Measure Program Progress
- Improvements In Work--Program Re-baseline
  - Built 7000-line Detailed IMS
  - Critical Path Defined; Will Link To New EVM Baseline
  - Feeds Tiered Schedules (Easily Readable For PMs And Decision Makers) So Low-level Task Slips Are Flagged

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So it all boils down to the  
basics; cost schedule  
and technical  
performance with a  
clear understanding and  
acceptance of the risks.

# Common Symptoms of Failure

## McCurdy “Class of 2007” Programs

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- **Initial program structure from a big A perspective**

- Requirements definition - inability to manage requirements trade-space
- Cost estimating
- Funding
- Schedule
- Risk assessment/technology maturity

- **Program Execution**

- Ineffective IMS with lack of critical path
- Systems engineering, particularly early in acquisition cycle
- Adding new capabilities within existing program baseline
- DT&E failed to accurately predict OT&E results
- Premature entry into production
- No consequences for poor program performance

- **Lack of program stability - requirements,**

# Says?

## Mr. Young's Take ...

- Mar 09 GAO Evaluation of 2008 DoD Acquisition
- 96 Programs; \$296B Cost

### • Mr. Young's Analysis:

Amount	# Programs	Driver	
\$95.7B	18	Qty Increases	Not True Cost Growth
\$72.2B	9	Qty Decrease	Not True Cost Growth
-\$57B	39	Negative Growth (Qty Decreases)	Good unit cost control
\$166.6B	73	Multiple Internal & External	
\$277.5B	94		

Low Cost Estimates  
Fluid Requirements  
Optimistic Schedules  
Excessive Certification Stds  
Immature Design/Technology  
Poor Govt/Industry Performance

*"I do not think it is possible to conclude that the DoD acquisition process alone is broken" - Mr. John Young*

# the Importance of Communication

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Clear and  
constant  
communication  
to everyone  
involved is  
essential.

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It only works with  
determination and  
leadership.

2 quick data points



# Amazing Catch Super Bowl XLII



The defining play of the game: faced with third down and five yards to go from their own 44-yard line with 1:15 remaining, Giants quarterback Eli Manning avoided what looked like a sack and completed a 32-yard pass to wide receiver David Tyree, who made a leaping catch **by pinning the ball on his helmet**. Four plays later Giants score the winning touchdown with 0:35 left in the game.

Question: Who was the PM for the helmet?

Answer: Doesn't matter, the PM isn't going to get a Super Bowl ring much less any credit.

**Leadership:** "If anything goes bad, I did it. If anything goes semi-good, we did it. If anything goes real good, then you did it. That's all it takes to get people to win football games for you." *Paul Bear Bryant*

# Do You Recognize this Weapon System?



Lockheed SkunkWorks – Palmdale, CA

- First F-117 Production Aircraft
- Crashed on its maiden flight
- Cause was a mis-wired yaw and pitch gyros

Did not change the determination to continue with the program!

# Summary

**Weapon System Acquisition is a contact sport, it's not for the timid**

**It has never been perfect, never will**

**Risk management is key, both high risk and low risk**

**Don't forget the 5 P's...Proper Planning Prevents Poor Performance**

***Noli nothis permitttere te terere\****





# Final Thoughts on Current Economic Situation

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